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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,576	02/12/2004	Toshiharu Furukawa	ROC920030271US1	6152
30206	7590	05/01/2009	EXAMINER	
IBM CORPORATION ROCHESTER IP LAW DEPT. 917 3605 HIGHWAY 52 NORTH ROCHESTER, MN 55901-7829			NADAV, ORI	
			ART UNIT	PAPER NUMBER
			2811	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/777,576	Applicant(s) FURUKAWA ET AL.	
	Examiner Ori Nadav	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5-13,19 and 34-42 is/are pending in the application.
- 4a) Of the above claim(s) 9-13 and 36-42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-8,19,34 and 35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 7-8 and 35 are rejected under 35 U.S.C. 102(e) as being anticipated by Dubin et al. (6,933,222).

Regarding claim 1, 3, 7-8, Dubin et al. teach in figure 5F and related text a device structure comprising:

a first transistor including a first gate electrode 202 with a vertical sidewall, a first gate dielectric 215 disposed on the vertical sidewall of said first gate electrode, at least one first a semiconducting carbon nanotube 250a having a first end, a second end, and a channel region between said first and second ends and disposed adjacent to said vertical sidewall of said first gate electrode, a first source/drain contact 222 electrically coupled with said first end of said at least one first semiconducting carbon nanotube, and a second source/drain contact 224 electrically coupled with said second end of said at least one first semiconducting carbon nanotube;

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a second transistor including a second gate electrode 202 with a vertical sidewall, a second gate dielectric 215 disposed on the vertical sidewall of said second gate electrode, at least one second semiconducting carbon nanotube 250b having a first end, a second end, and a channel region between said first and second ends and disposed adjacent to said vertical sidewall of said second gate electrode, a third source/drain contact 222 electrically coupled with said first end of said at least one second semiconducting carbon nanotube, and a fourth source/drain contact 224 electrically coupled with said second end of said at least one second semiconducting carbon nanotube: and

a dielectric-filled space 216 between said vertical sidewall of said first gate electrode and said vertical sidewall of said second gate electrode, said at least one first semiconducting carbon nanotube disposed within said dielectric-filled space,

wherein each of said at least one first semiconducting carbon nanotube is a single-wall semiconducting carbon nanotube,

wherein said first transistor further comprises: an insulating layer 214 disposed between said first source/drain contact and said first gate electrode for electrically isolating said first contact from said first gate electrode,

wherein said first transistor further comprises: an insulating layer 215, 216 disposed between said second source/drain contact and said first gate electrode for electrically isolating said second source/drain contact from said first gate electrode, and a capacitor electrically coupled with said first source/drain contact.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dubin et al.

Dubin et al. teach substantially the entire claimed structure, as applied to claim 1 above, including a substrate 210 carrying said first and second transistors and characterized by a surface area viewed vertical to the substrate.

Dubin et al. do not state that said dielectric-filled space ranges from about 20 percent to about 50 percent of said surface area.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a space ranging from about 20 percent to about 50 percent of said surface area in prior art's device in order to reduce the size of the device (by providing a space ranging only from about 20 percent to about 50 percent of the total surface area) and by optimizing the characteristics of the device (by not providing the structures too close to each other which may degrade the device performance).

Claims 5-6 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dubin et al. in view of Farnworth et al. (6,515,325).

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Regarding claims 5 and 34, Dubin et al. teach substantially the entire claimed structure, as applied to claim 1 above, except explicitly stating that said first source/drain contact includes a catalyst pad characterized by nanocrystals of a catalyst material effective for growing said at least one semiconducting carbon nanotube.

Farnworth et al. teach in figure 2A and related text (column 4, lines 32-50) a first contact includes a catalyst pad (by considering the first contact layer as layer 16, the catalyst pad is layer 16) characterized by nanocrystals of a catalyst material effective for growing said at least one semiconducting carbon nanotube.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the first contact in prior art's device by including a catalyst pad characterized by nanocrystals of a catalyst material effective for growing said at least one semiconducting carbon nanotube, in order to simplify the processing steps of making the device by using conventional growing method of semiconducting carbon nanotube.

Regarding claim 6, prior art's device includes said first end of said at least one semiconducting carbon nanotube incorporates an electrical-conductivity enhancing substance (the electrical-conductivity enhancing substance is the material of said at least one semiconducting carbon nanotube).

Regarding the process limitations recited in claims 5-6 and 34 ("nanocrystals of a catalyst material effective for growing said at least one semiconducting carbon

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nanotube”, and “an electrical-conductivity enhancing substance diffused from said catalyst pad into said first end during growth”), these would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced. Note that a “product by process” claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

Response to Arguments

Applicant's arguments with respect to the claims above have been considered but are moot in view of the new ground(s) of rejection.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-4670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

O.N.
5/1/2009

/ORI NADAV/
PRIMARY EXAMINER
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